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Experiments on mobile robot stereo vision system calibration under hardware imperfection

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Abstract

© The Authors, published by EDP Sciences. Calibration is essential for any robot vision system for achieving high accuracy in deriving objects metric information. One of typical requirements for a stereo vison system in order to obtain better calibration results is to guarantee that both cameras keep the same vertical level. However, cameras may be displaced due to severe conditions of a robot operating or some other circumstances. This paper presents our experimental approach to the problem of a mobile robot stereo vision system calibration under a hardware imperfection. In our experiments, we used crawler-Type mobile robot «Servosila Engineer». Stereo system cameras of the robot were displaced relative to each other, causing loss of surrounding environment information. We implemented and verified checkerboard and circle grid based calibration methods. The two methods comparison demonstrated that a circle grid based calibration should be preferred over a classical checkerboard calibration approach.

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